

Amendments to the Specification:

Please replace the paragraph found at page 1, lines 10-21, with the following paragraph:

Because polyolefins such as polypropylene, polyethylene, etc. have excellent properties of light weight, large strength, good chemical resistance, etc., they are extensively used for films, non-woven fabrics, molded materials for automobile components and members of electrical apparatus, etc. On the other hand, polyolefin materials have a small polarity and a high crystallinity, which are derived from its chemical structure, thus they have a small hydrophilic property and a difficulty in chemical modification. Various surface activation treatments such as ozone treatment, plasma treatment, ultraviolet light irradiation, high voltage electric discharge, corona discharge, etc. have been carried out to improve the hydrophilic property and adhesive property of polyolefin materials. However, even if any method of them is employed to treat a polyolefin material, we cannot obtain an effective result that the treated material absorbs water as much as several times the weight of original material.

Please replace the paragraph bridging pages 2-3 with the following paragraph:

The present invention provides a method for improving a durable water absorption property, a hydrophilic property and an adhesion, etc. for a polymeric material without lowering the practical strength. The present invention also provides medical/sanitary/cosmetic supplies; disposable diapers, sanitary or other napkins, bandages, gauze and disinfectants and various water-absorption materials for cleaning, cleanser pack, etc., water retention materials useful for agriculture/greening in dry districts, materials for microorganism culture media, synthetic paper, filter media, battery separators with alkali/acid proofing, members of writing materials with an excellent absorption property of

water-soluble ink, wiping/cleansing materials, [brackets for straightening of irregular teeth] orthodontic brackets, medical materials (artificial organs, artificial joints, medical tubes and the other molded materials with string or plate forms), polymeric materials with improved adhesive property and polymeric materials for composites.

Please replace the paragraph found on page 3, lines 26-29, with the following paragraph:

A fourth aspect of the present invention relates to the method to improve polymeric materials by (1) the step of a solvent-treatment, (2) the step of activation-treatment, (3) the step of a hydrophilic [polymer-treatment] polymer treatment and (4) the step of monomer grafting in this order.

Please replace the paragraph found bridging pages 3-4 with the following paragraph:

The present invention also relates to the products prepared from the polymeric materials improved by the above methods; a water absorption material, a water retention material, a material for microorganism culture media, a synthetic paper, a filter medium, a battery separator, a member of writing materials (members made of polymer used for various kinds of pens with water-soluble ink, felt pens, brush pens, fountain pens and ball-point pens, etc.) a wiping/cleansing cloth, a disposable medical/sanitary/cosmetic supply (a diaper, a sanitary napkin, a bandage, a gauze, the other medical/sanitary supply and various cosmetic supplies for cleaning/cleansing pack, a material improved in adhesion property, [a bracket for straightening of irregular teeth] orthodontic brackets, a medical material (an artificial organ, an artificial joint, a medical tube and the other molding material of tube, string or plate), etc.

Please replace the paragraph found bridging pages 4-5 with the following paragraph:

Both thermoplastic polymers and thermosetting polymers are used as synthetic polymers. Various methods for the preparation of these polymers are exemplified, and all polymers prepared by these methods can be used. For example, the following polymers are available[;] : (1) polymers made by an addition polymerization; homopolymers or copolymers prepared by the polymerization of a single kind of monomer or a mixture of monomers selected from olefins, vinyl compounds except olefins, vinylidene compounds, the other compounds with C=C double bonds, (2) polymers made by polycondensation; a polyester and a polyamide, etc. or their mixture or modified polymers, (3) polymers made by addition polycondensation; phenol resin (containing Kynol (commercial name of Japan Kynol Co., Ltd.), urea resin, melamine resin, xylene resin, or their mixture or modified polymers, (4) polymers prepared by polyaddition; polyurethane, polyurea, and [these] their mixture or modified polymers, (5) polymers prepared by the ring-opening polymerization; a homopolymer or a copolymer prepared by cyclopropane, ethylene oxide, propylene oxide, lactone and lactam, and [these] their mixtures or modified polymers, (6) cyclic polymers; polymers prepared by the polymerization of divinyl compounds (e.g. 1,4-pentadiene) or diyne compounds (e.g. 1,6-heptadiyne) and [these] their mixture or chemically modified polymers, (7) polymers prepared by isomeric polymerization; e.g. alternative copolymer of ethylene and isobutene, (8) polymers prepared by the electrolytic polymerization; a homopolymer or a copolymer prepared by pyrrole, aniline and acetylene, etc. and their mixture or chemically modified polymers, (9) polymers made of aldehydes and ketones, (10) poly(ethersulfone) and (11) polypeptides.

Please replace the paragraph found on page 5, lines 10-13, with the following paragraph:

In the present invention, the polymers made by an addition polymerization described above are preferably used. Monomers used in an addition polymerization are not specially limited. A homopolymer or a copolymer of α -olefins such as ethylene, propylene, butene-1, pentene-1, hexane-1, 4-methylpentene-1, octane-1, etc. are used.

Please replace the paragraph found on page 5, lines 14-17, with the following paragraph:

In the present invention, vinyl compounds except olefins give the compounds with vinyl groups. For instance, the following compounds are given; vinyl chloride, styrene, acrylic acid, methacrylic acid, esters [or] of acrylic or methacrylic acids, vinyl acetate, vinyl ethers, vinyl carbazole, and acrylonitrile, etc. As compounds except olefins give give compounds containing vinylidene groups; vinylidene chloride, vinylidene fluoride and isobutylene are exemplified.

Please replace the paragraph found on page 5, lines 23-30, with the following paragraph:

As preferable polymers made by the addition polymerization, homopolymers or copolymers of two or more monomers selected from these monomers or a mixture of these polymers can be suitably used. Especially preferable addition polymers are polyethylene, a copolymer of ethylene and the [another] other α -olefin, polypropylene, a copolymer of propylene and the [another] other α -olefin. These copolymers represent both of random copolymers and polyolefins. As the present invention is effective for the improvement of the hydrophilic property of [polypropylene] polyolefins, which is especially difficult for a chemical treatment, polyolefins are preferably used.

Please replace the paragraph found on page 6, lines 1-7, with the following paragraph:

As polymeric materials other than polyolefins, homopolymers or copolymers of monomers selected from vinyl compounds, vinylidene compounds or compounds with carbon-carbon double bonds; poly(methacrylate)s, poly(acrylate)s, polystyrene, polytetrafluoroethylene, copolymers containing acrylonitrile (acrylic fiber and its molded product and ABS resin, etc.) and copolymers containing butadiene (synthetic rubber), etc., polyamides (containing nylon and aliphatic or aromatic polyamides), polyesters (containing polyethylene terephthalate and aliphatic or all-aromatic polyesters), polycarbonate, polyurethane, polybenzoate, polyethersulfone, a carbon material such as carbon fiber, etc., various synthetic rubbers, wool, silk, etc. are preferably used.

Please replace the paragraph found on page 6, lines 8-15, with the following paragraph:

As the polymers except the above ones, the following polymers are preferably used; poly(phenol) (commercial name, Kynol), poly(alkyl-*p*-hydroxybenzoate), polyimide, poly(benzimidazole), poly(*p*-phenylene benzbisthiazole), poly-(*p*-phenylene benzbisoxazole), poly(benzoxazole), and the following fibers are preferably used; cotton, flax, hemp, ramie, jute, and other vegetable fibers, animal hair fibers except wool, cellulose acetate, regenerated cellulose (rayon, cupra, polynosic, etc.), vinylon, a copolymer of vinylalcohol and vinylchloride (polychlal; commercial name, Cordera) and casein fiber. In addition, mixtures or composites of these polymeric materials are preferably available.

Please replace the paragraph found on page 6, lines 18-20, with the following paragraph:

It is possible to improve the polymeric materials containing antistatic agents, stabilizers, nucleation agents, flame retardants, foaming agents and various additives which are usually added in polymeric materials by the present invention.

Please replace the paragraph found on page 7, lines 15-19, with the following paragraph:

In the present invention, the activation treatment process is to introduce functional groups containing oxygen or nitrogen [etc.] or unsaturated bonds into polymeric materials by various treatments such as ozone treatment, ultraviolet light irradiation treatment, discharging process, etc. It is not necessary to put vinyl monomers or other organic compounds in the process.

Please replace the section heading found on page 23, line 23, with the following:

(10) Orthodontic Brackets [for Straightening of Irregular Teeth]

Please replace the paragraph found on page 26, lines 20-22, with the following paragraph:

(20) Battery separator made of glass fiber: Thickness 1.0 mm, unit weight 342 g/m², density 0.2 g/m³, fineness 10 μm, fiber length 4 – 8 [mm] cm, space volume ratio 93% and water absorption 780%. It was usewd in Comparative Example 7.

Please replace the paragraph found on page 26, lines 23-25, with the following paragraph:

(21) Orthodontic Brackets [for straightening of irregular teeth]: Size 2.23 x 3.0 x 3.8 mm, weight about 31 mg, a polypropylene molded material reinforced with aluminum fitment. It was used in Example 33.

Please replace the paragraph found on page 31, lines 2-5, with the following paragraph:

A contact angle measuring apparatus (a product of CA-X of Kyowa Kaimen Kagaku Co., Ltd.) was employed. A water drop of about 1 mm diameter was put on a surface of a specimen by an injector at 20° C, and the [ware] water drop was enlarged by a video camera and the contact angle was estimated.

Please replace the paragraph found on page 32, lines 19-25, with the following paragraph:

A polypropylene non-woven fabric 3 (0.3g) treated with ozone for 30 minutes was put in a vessel containing 100 ml of water, 0.3 g of PVA and 3 ml of methanol. The reaction mixture was maintained at 80°C for 2 hours with stirring. After the treatment, the fabric was washed with water and examined by “Water-absorption test 1”. The water absorption property on the fabrics examined by three times of “Water-absorption test 1” was 650%. The results are given in Table 1. Even after six times of the washing fastness test, the water absorption property of the treated fabric was kept over 810%.

Please replace the paragraph bridging pages 32-33 with the following paragraph:

A polypropylene fabric 3 (0.3 g) with no ozone-treatment was put in a vessel containing 100 ml of water, 30 mg of potassium persulfate, 0.3 g of PVA and 3 ml of methanol. The reaction mixture was maintained at 80°C for 2 hours with stirring. After the treatment, the fabric was washed with water and “Washing fastness test 1” was carried out. The water absorption of the treated fabric by “Absorption test 1” gave 760%. The water absorption decreased to 260% after six times of the washing fastness test. The results are given in Table 1. The weight of the specimen after the hydrophilic treatment was 4 weight % of the original weight. Thus, when the activation step was not carried out, the water absorption property of the treated specimen was markedly decreased.

Please replace the paragraph found on page 33, lines 8-12, with the following paragraph:

A polypropylene fabric (0.3 g) was ozone-treated for 30 minutes and was put in a vessel containing 100 ml of water, 0.3 g of CMC and 3 ml of methanol. The reaction mixture was maintained at 80°C for 2 hours with stirring. After the treatment, the fabric was washed with water. After three times of “Washing fastness test 1”, the water absorption of the treated fabric was [773] 580 %. The results are given in Table 1.

Please replace the paragraph found on page 33, lines 24-30, with the following paragraph:

A polypropylene fabric 3 (1.0 g) with no activation treatment was put in a vessel containing 200 ml of water, 0.5 g of CMC, 50 mg of potassium persulfate and 3 ml of methanol. The reaction mixture was maintained at 75°C for [2 hours] 1 hour with stirring. After the treatment, the fabric was washed with water and “Washing fastness test 1” was

carried out. The water absorption was 630% after the first washing fastness test. The results are given in Table 1. After three times of the washing fastness test, the water absorption is decreased to 250%.

Please replace the paragraph found on page 34, lines 15-22, with the following paragraph:

A polypropylene non-woven fabric 1 (1.0 g) was plasma-treated for 30 seconds at a power supply of 60V and it was put in a vessel. A 100 ml of water and 1.0 g of agar powder were put in the vessel, and they were dissolved by heating. Then, 60 mg of [potassium persulfate] cerium ammonium nitrate (IV) and 3 ml of methanol were added in the mixture. The reaction mixture was maintained at 60°C for 1 hour with stirring. After the treatment, the fabric was washed with water. The water absorption of the treated fabric estimated by “Water absorption test 1” was 595%. After two times of “Washing fastness test 1”, the water absorption of the treated fabric was [411] 410%. The results are given in Table 1.

Please replace the paragraph found on page 42, lines 11-20, with the following paragraph:

Then, the treated fabric was put in a cylindrical reaction vessel, and 40 ml of methanol, 500 ml of water, 10 g of PVA and 400 mg of cerium ammonium nitrate (IV) were added in it. The reaction mixture was maintained 80°C for 2 hours with stirring. After this step, the specimen was washed with boiling water for three minutes. Then, the obtained specimen was put in a cylindrical reaction vessel, and 500 ml of water, 400 mg of cerium ammonium nitrate (IV) and 20 ml of acrylic acid were added in it. The reaction mixture was maintained 80°C for 2 hours with stirring. The treated non-woven fabric was washed with an aqueous soap solution (conc. 0.1 wt%, liquor ratio = 1/20) at 60°C, and rinsed well in water and dried. The grafting was 2%. [A water absorption of the treated fabric examined by

“Water absorption test 1” was 80%. A weight increase of the specimen after the hydrophilic treatment was 0.2%.] Its retention property of an electrolytic solution (40 wt% sulfuric acid solution) was 650%. When the relative tensile strength of an untreated fabric was defined as 1.0, the relative tensile strength of the treated fabric was 0.94.

Please replace the paragraph found on page 42, lines 25-29, with the following paragraph:

Sulfuric acid-resistance test: The obtained specimen was dipped in an aqueous sulfuric acid solution (40 wt%) at 70°C for a week. The specimen was sufficiently washed with water and dried. The retention property of the specimen to the electrolytic solution (a retention % of the sulfuric acid solution) was [600%] 660%, and the relative tensile strength was 0.94.

Please insert the following new paragraph after line 29, and before line 30, on page 42:

Oxidant-resistance test: The obtained specimen was dipped in an aqueous hydrogen peroxide solution (concentration, 20 weight %) for one week at 30°C. The specimen was sufficiently washed with water and dried. The retention property of the obtained specimen to the electrolytic solution (a retention % of the sulfuric acid solution) was 600%, and the relative tensile strength was 0.94.

Please insert the following new paragraph after line 6, and before line 7, on page 43:

From these results, it is found out that a separator for a lead storage battery using an excellent retention property of an electrolytic solution, a long-life and a light weight can be produced inexpensively.

Please replace the paragraph found on page 50, lines 21-27, with the following paragraph:

In addition, it is possible that the surface property of various kinds of materials can be improved to give [another property] other properties to them, which can provide a further development in applications. The present invention can improve an affinity of water-soluble ink, the property of various kinds of medical/sanitary/cosmetic supplies and textile products for clothing, an adhesion property of orthodontic brackets [for straightening of irregular teeth] made of polypropylene and the water wettability and the other physical [property] properties of medical materials.